allow full local service competition through three types of entry: resale, leasing of UNEs and investment in and ownership of full facilities.[116] Various competitive LECs pursued these strategies either singly or in combination. Total service resale requires the least initial capital investment, but is limited to reselling the incumbent LEC products with little opportunity to vary the products other than through improved customer service and bundling additional products with resold local service. Full ownership of facilities, on the other hand, allows the competitive LEC to totally engineer its own network, giving maximum control and flexibility but requiring the most capital investment. Leasing some parts of the network as UNEs, such as unbundled loops, can be accomplished at a lower initial capital investment than full facilities ownership and provides greater flexibility to develop services than does resale, but it may result in less network flexibility to add new services than does full facilities ownership.

37. The competitive LEC industry grew rapidly beginning in 1997. This initial expansion was followed by consolidation beginning in 2001. Direct competitive local service was being offered to mass market and enterprise customers. To a smaller degree, some competitive LECs began to provide selected transport services to other competitive LECs on a wholesale basis. One telecommunications trade association has estimated that in 2000 there were about 300 facilities-based competitive LECs, but that by early 2002 that number had contracted to about 70.[117]

38. The competitive LEC industry experienced major difficulty in 2001 and 2002 due to a slowing general economy and major reduction in access to capital. Some trade associations estimate that competitive LEC capital spending of $21.7 billion in 2000 was down to an estimated $10.7 billion for 2002.[118] Although there has been a significant reduction in the number of competitive LECs, the capital assets for those exiting carriers in some cases returned to productive use by other entities. Accordingly, much of this investment has not been lost, but rather shifted to new companies and put back into service.[119]

39. Although precise figures about competitive LEC services are difficult to obtain, parties in this proceeding have provided some estimates.[120] At the end of 2001, competitive

(Continued from previous page)

Atlantic Telephone Cos., v. FCC, 24 F.3d 1441; *Remand Order*, 9 FCC Rcd 5154 (1994) (*Virtual Collocation Order*), *remanded for consideration of 1996 Act, Pacific Bell v. FCC*, 81 F.3d 1147 (1996).

[116] 47 U.S.C. § 251. Congress recognized that it might be inefficient or impossible for competitive LECs to duplicate the entire incumbent LEC telecommunications network to enter a market and established several modes of possible market entry, including resale and UNEs, as well as full facilities deployment.

[117] ALTS, THE STATE OF LOCAL COMPETITION 2002, Annual Report 5 (Apr. 2002) (ALTS 2002 Report).

[118] *Id.* at 11.

[119] *See* ALTS, PROGRESS REPORT ON THE CLEC INDUSTRY (Oct. 17, 2002), <http://www.alts.org/Filings/101702CLECProgressReport.pdf>, for ALTS' detailed analysis of current and projected health of the competitive LEC industry.

[120] The data supplied do not generally distinguish between mass market and enterprise services, but they provide some clues about the state of competition in the mass market.

LECs had almost 25,000 collocation arrangements with the BOCs, up from less than 5,000 in 1998.[121] Minutes of traffic exchanged had grown from less than 100 billion to almost 500 billion minutes from 1998 through 2001.[122] In the same time period, competitive LEC access lines grew from an estimated 8-9 million to 23-32 million lines.[123] Estimates provided by analysts, BOCs, and trade groups indicate that competitive LEC revenues from local service have risen from $3.5 billion in 1998 to $9.5 billion in 2001.[124] By 2001, competitive LECs had deployed about 1,300 local circuit switches, with potential coverage of over 86 percent of BOC access lines.[125]

40. Incumbent LECs have also entered the competitive LEC market. Some have expanded their existing network into adjacent, usually BOC, territory. Others have established separate competitive entities and operate further afield.[126] In addition to existing telecommunications companies expanding into local service, new companies have been created to address new opportunities.[127] Cable companies have also deployed networks to serve business customers.[128] These are generally not the historic hybrid-fiber-coaxial cable networks providing service to residential customers but newly deployed facilities specifically designed to serve enterprise customers.

41. Competitive LECs' purchase of total service resale has declined from a peak of almost 5.4 million lines in 2000 to below 3.5 million lines by mid-2002.[129] Over the same time

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[121] SBC Comments, Attach. A at I-4.

[122] *Id.* at I-4.

[123] *Id.* at I-5. In mid-2002, competitive LECs reported they provided slightly more than 21 million total access lines, including resale, UNEs and full facilities; competitive LEC-owned facilities comprised about 6.2 million lines. Industry Analysis and Technology Division, Wireline Competition Bureau, *Local Telephone Competition: Status as of June 30, 2002* (Dec. 2002) at Table 3 (*Local Telephone Competition December 2002 Report*).

[124] SBC Comments, Attach. A, UNE Fact Report 2002 at I-13 (BOC UNE Fact Report 2002); ALTS 2002 Report at 9.

[125] BOC UNE Fact Report 2002 at II-1. The record indicates that in 2001, competitive LECs owned 339,501 route miles of fiber. ALTS 2002 Report at 17.

[126] There are at least 45 competitive LECs with incumbent LEC affiliations. Numbering Resource Utilization/Forecast (NRUF) FCC Form 502, as of December 31, 2001, staff calculation.

[127] For example, Sempra in San Diego and Dominion Telecom in Hartford-New Haven were laying fiber. Utility companies such as Avista, Montana Power, Pacific Enterprises of Southern California, UtiliCorp of Kansas/Missouri and PEPCO entered the telecommunications business. Citizens Utilities, for one, has more than two million access lines in the United States. *See* Telecommunications Industry Association, *2002 Telecommunications Market Review and Forecast*, at 37 (2002) (TIA 2002 Market Review).

[128] In June 2002 cable carriers responded that they provide fewer than 16,000 coaxial cable connections to medium and large businesses; small business and residential services are not separately reported. Industry Analysis and Technology Division, Wireline Competition Bureau, *High Speed Services for Internet Access: Status as of June 30, 2002* (Dec. 2002) calculation using Table 3 and Table 5 (*High Speed Services December 2002 Report*).

[129] *Local Telephone Competition December 2002 Report* at Table 2, Table 4.

period, total access lines served by UNE-Loops (UNE-L) and UNE-P combinations have grown from about 1.5 million to about 11.5 million.[130] UNE-L grew from 1 million to 4 million lines. UNE-P lines grew from less than half a million to almost 7.5 million.[131] These UNE-L and UNE-P represent approximately 6.9 percent of BOC access lines.[132] Competitive LECs provide service to about 16-20 percent of all access lines in the BOC territories: 26-33 percent of business access and about 9 percent of residential access lines.[133] Considering all modes of entry, competitive LEC lines probably exceed 10 percent of BOC lines in most states. The BOCs at present serve 87 percent of all incumbent LEC access lines while the "independent" incumbent LECs serve the balance.[134]

42. Fiber transport facilities have also increased in recent years. The BOCs estimate that since 1998, competitive LEC-owned fiber has increased from 100,000 to 184,000 route miles. In addition, wholesale suppliers of fiber continue to invest in facilities that are being used by all carriers.[135] Much of this interoffice transport is long-haul intercity, rather than local. For any given city, a competitive LEC may or may not have non-incumbent LEC interoffice transport sufficient to link the various wire centers necessary to offer local service.[136]

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[130] The UNE-P consists of a leased combination of the loop, local switching and shared transport UNEs.

[131] *Local Telephone Competition December 2002 Report* at Table 4. PACE estimates that UNE-P grew to over ten million lines by the end of 2002. Letter from Genevieve Morelli, Counsel for PACE, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-338, 96-98, 98-147, Attach. at 1 (filed Jan. 14, 2003) (PACE Jan. 14, 2003 UNE-P Fact Report).

[132] *Local Telephone Competition December 2002 Report* at Table 4. In mid-2002, about 65% of UNE lines included switching. While competitive LEC end-user lines increased by about 30% from December 2000 to June 2002, UNEs and especially UNE-P have become a higher percentage of competitive LEC lines from 2000 to mid-2002. Considering the PACE estimate of ten million UNE-P lines at the end of 2002, competitive LECs would have 8.2% of BOC lines in UNE-L and UNE-P. PACE Jan. 14, 2003 *Ex Parte* Letter, UNE-P Fact Report Attach. at 1.

[133] BOC UNE Fact Report 2002 at I-7. This figure includes competitive LEC services provided through resale, UNE-P, UNE-L and fully-owned facilities.

[134] Industry Analysis and Technology Division, Wireline Competition Bureau, *Trends in Telephone Service* (May 2002) at Table 8.3 (*Trends in Telephone Service May 2002 Report*).

[135] BOC UNE Fact Report 2002 at III-8 to III-14. The route miles deployed and planned are difficult to estimate. ALTS estimates competitive LEC fiber miles at almost 340,000 miles in 2001. ALTS 2002 Report at 17.

[136] Allegiance Comments at 28. Allegiance provisions about 70% of its DS3 interoffice transport through the incumbent LEC. *Id.* ALTS states that competitive fiber is only available in about 15% of all BOC wire centers. ALTS *et al.* Comments at 63. Covad and Mpower state they have competitive fiber alternatives in about one-half of the incumbent LECs central offices where they collocate. Covad Comments at 67-68; Mpower Reply at 13-16; Letter from Ross A. Buntrock, Counsel for Mpower, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-338, 96-98, 98-147 at 7 (filed Oct. 11, 2002) (Mpower Oct. 11, 2002 *Ex Parte* Letter). Broadview has experienced competitive transport availability in only about 20% of cases. Letter from Rebecca H. Sommi, Vice President, Operations Support, Broadview, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-338, 96-98, 98-147 at 14 (filed Aug. 2, 2002) (Broadview Aug. 2, 2002 *Ex Parte* Letter); *see also* Letter from Joan Marsh, Director, Federal Government Affairs, AT&T, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-338, 96-98, 98-147 at 7-10 (filed Oct. 8, 2002) (AT&T Oct. 8, 2002 *Ex Parte* Letter).

B. Markets for Telecommunications Services

43. Some competitive LECs have pursued the medium and large business enterprise markets while others have pursued mass market strategies. As discussed below in detail, the economic characteristics of these markets vary significantly.[137] In this Part, we summarize general observations about the overall development of competition for these customer classes.

1. The Enterprise Market

44. Within the enterprise market for telecommunications services, new entrants began competing with the incumbent LECs in the mid-1980s. Beginning in New York in the mid-1980s, competitive fiber suppliers (competitive access providers or CAPs) began providing competitive exchange access service to larger business customers.[138] The CAPs, in general, provided a specialized service to their customers – connecting incumbent LECs' local wire centers to interexchange carriers' points of presence (POPs) and large enterprise customers directly to interexchange carrier POPs.[139] The CAPs enjoyed some success in this market as they were able to underprice the incumbent LECs' comparable (but regulated) special access services.[140] By 1993, the ten largest CAPs had revenues of $209.6 million from providing competitive access either through fiber or microwave technologies, out of a total of $91 billion in telecommunications revenue nationally.[141] CAPs began to install more infrastructure and expand services where approved by state regulatory authority. By 1995, the CAPs' total revenues had exceeded $1 billion with about one-half from dedicated access and private line service and the balance from local switched service, switched access and data service.[142] Approximately 57 CAPs were providing competitive access services in 1996 and were well positioned when Congress passed the 1996 Act.[143] Interexchange carriers and CAPs quickly entered the newly

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[137] *See infra* Part V.B.2.

[138] By the late 1980s, companies like Teleport Communications Group in New York; Institutional Communications Company in Washington, D.C.; Chicago Fiber Optic/MFS in Chicago, Baltimore and Philadelphia; Kansas City Fiber Net in Kansas City; and other CAPs had begun to develop networks in traditional BOC territories. RICHARD G. TOMLINSON, TELE-REVOLUTION – TELEPHONE COMPETITION AT THE SPEED OF LIGHT 87-88 (2000).

[139] AT&T, MCI and Sprint are the largest interexchange carriers. Industry Analysis and Technology Division, Wireline Competition Bureau, *Statistics of Communications Common Carriers* (Sept. 2002) at Table 1.4 (*Statistics of Communications Common Carriers December 2001 Report*). These interexchange carriers accounted for 83% of reported 1996 long distance carrier revenues. CAPs connected large business customers directly to the interexchange carrier's POP, bypassing the incumbent LEC's switch and thereby avoiding access charges.

[140] In 1999, the Commission established a framework by which incumbent LECs could obtain pricing flexibility in the provisioning of special access services. *See Access Charge Reform*, CC Docket Nos. 96-262, 94-1, 98-157, CCB/CPD File No. 98-63, Fifth Report and Order and Further Notice of Proposed Rulemaking, 14 FCC Rcd 14221, 14224-25, paras. 2-3 (1999) (*Pricing Flexibility Order*).

[141] TOMLINSON, *supra* note 138, at 241-42.

[142] *Id.* at 241-65.

[143] TIA 2002 Market Review at 37.

opened local markets as competitive LECs,[144] and large interexchange carriers began to acquire CAPs to facilitate local market entry.[145]

45. Since 1996, new entrants have captured some of the enterprise market. Competitive LECs report about 51 percent of their customer access lines serve medium and large business customers.[146] Unlike the incumbent LEC legacy network that was built out from central offices in a radiating pattern, competitive LECs collocated in few incumbent LEC central offices and built fiber ring-lateral-spur configurations to connect large business customers.[147] Competitive LECs self-provision facilities, lease facilities from other competitive facilities providers or purchase high-capacity (DS1 and above) loops either as UNEs or special access services from the incumbent LECs. Competitive LECs' high-capacity loops, however provisioned, are difficult to count. BOCs estimate that competitive LECs' share of special access revenues is at least 28 percent.[148] The enterprise market has been expanding, and the BOCs also expanded their services in this market. BOCs report about 22 percent of their customer access lines serve medium and large business customers.[149] Further, BOCs state that they provided 19.5 million special access lines in 1996, growing to 78.6 million lines in 2001.[150] BOC provisioning of fiber and high-capacity loops to end-user customers' premises significantly increased in recent years. Total BOC reported DS1s terminating at customer premises increased over four fold from fewer than 300,000 in 1996, to over 600,000 by 1999 and almost 1.3 million in 2001.[151] BOC

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[144] Carriers have not generally used satellite technologies to serve the enterprise market. While there was some fixed wireless entry in the enterprise market, it has been limited. *See, e.g.*, AT&T Comments, Attach. F, Declaration of Robert D. Willig (AT&T Willig Decl.) at paras. 200-01.

[145] MCI had acquired extensive rights-of-way and fiber cable in over 100 cities from Western Union in 1990, creating the competitive LEC MCIMetro in 1994. WorldCom acquired MFS, the largest competitive LEC, in 1996, Brooks Fiber in 1997 and MCIMetro, the fourth largest competitive LEC, in 1998. WorldCom had also acquired UUNET Technologies (which was providing Internet access to 350 corporate local area networks (LANs)) in August 1996. AT&T acquired the second largest ex-CAP, Teleport Communications Group, in early 1998. Accordingly, for a period of time after the enactment of the 1996 Act, WorldCom and AT&T were the two largest competitive LECs, accounting for about one-half of all competitive LEC revenues for 1998. TOMLINSON, *supra* note 138, at 346-54.

[146] *Local Telephone Competition December 2002 Report* at Table 2.

[147] MARTIN F. MCDERMOTT III, CLEC – AN INSIDER'S LOOK AT THE RISE AND FALL OF LOCAL EXCHANGE COMPETITION 64 (2002).

[148] BOC UNE Fact Report 2002, App. L, at L-1, L-2. It is difficult to obtain data on the competitive LECs' market share. It appears, however, that the special access market is growing and the BOCs themselves are providing more special access services. *Id.*

[149] *Local Telephone Competition December 2002 Report* at Table 2.

[150] *Statistics of Communications Common Carriers September 2002 Report* at Table 2.6; Industry Analysis Division, Common Carrier Bureau, *Statistics of Communications Common Carriers* (Dec. 1997) at Table 2.10 (*Statistics of Communications Common Carriers December 1997 Report*).

[151] ARMIS Report 43-07 (Transmission Facilities, DS1s Terminated at Customer Premises, 1996 to 2001).

reported fiber terminated to customers' premises more than doubled between 1996 and 2001, from just under 1 million to over 2 million lines.[152]

46. To meet the business demands of enterprise customers, competitive carriers must meet more stringent design and operational standards with higher capacity and more reliability. Specifically, enterprise customers demand several different kinds of packet switching services provided by these competitive carriers including frame relay, and its predecessor X.25, which allow local area networks to be connected across a public network. Frame relay is especially valuable in connecting employees in several different, distant locations and more than 35,000 enterprises customers utilize frame relay with more than one million ports.[153] The frame relay market for services has grown from about $1.3 billion in 1996 to $7.6 billion in 2001 and use of frame relay is growing at a faster rate than use of dedicated leased lines because it is more economical and flexible.[154] Another technology, asynchronous transfer mode (ATM), however, is the most widely used carrier backbone technology and can guarantee different quality of service levels to meet different customer needs.[155] Frame relay's rapid growth slowed somewhat in recent years, partially as ATM became more widely deployed. In 2001, ATM technology had a total bandwidth of over 12,000 DS0s while frame relay had fewer than 11,000 DS0 equivalents.[156]

47. A relatively new, but growing voice service used by enterprise customers is telephony provided over Internet protocol, also known as IP telephony.[157] Some analysts have estimated that close to half of U.S. businesses have implemented private business exchanges (PBXs) capable of providing IP telephony and place calls among corporate locations over an IP network: the IP PBX market is projected to be $3.9 billion (20 percent of the PBX market) by 2005, and 25 percent of call center contacts currently use IP technology.[158]

48. Some competitive LECs market integrated voice and data services to enterprise customers.[159] The business plan of these competitive LECs involves leasing high-capacity loops

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[152] *Id.* (Transmission Facilities, Fiber Terminated at Customer Premises, 1996 to 2001).

[153] TIA 2002 Market Review at 136.

[154] *Id.* at 138-39, Table III-11.2.

[155] *Id.* at 140.

[156] *Id.* at 143. In 2001, there were about 26,000 ATM ports compared to 1.2 million frame relay ports. The high cost and technical complexity relative to other technologies make ATM potentially vulnerable to new technologies that might be provided at a lower cost. *Id.* at 140-43.

[157] We do not intend to define the regulatory classification of "IP telephony" here, but merely to discuss its use and growth in very broad terms.

[158] *See, e.g.*, CommWeb.com, *VoIP/IP Telephony Statistics* (Oct. 15, 2002), <http://www.commweb.com/article/COM20021015S0002> (visited Dec. 16, 2002).

[159] Companies such as ITC^Deltacom, NewSouth and Cbeyond have focused on providing integrated services to the business market. ALTS *et al.* Comments at 16; *see also* NewSouth Comments at 7-38; NuVox Comments at 5-8; (continued....)

as UNEs and then using them efficiently to provide a bundled offering including voice, data and Internet access.[160]

49. In serving enterprise customers, the BOCs must operate under the Act's restrictions on BOCs originating long distance service from their regions until they have gained section 271 approval.[161] Many approvals have been granted, allowing the BOCs to expand their enterprise offerings. Currently, the BOCs have authority to provide in-region long distance service in 43 states, representing 82.6 percent of the BOC access lines and 82.2 percent of the United States population.[162] BellSouth was the first BOC to complete all section 271 authorizations for its service territory.[163]

2. The Mass Market

50. The mass market for telecommunications services before 1996 was served more by monopoly providers than was the enterprise market.[164] Since 1996, various competitive LECs have used one or more of the three entry strategies set forth in the 1996 Act to provide competitive local service to many residential customers in the United States. By mid-2002, over

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ITC^Deltacom Petition for Waiver of Supplemental Order Clarification, CC Docket No. 96-98 at 1-2 (filed Aug. 16, 2001) (ITC^Deltacom Aug. 16, 2001 Petition).

[160] ALTS *et al.* Comments at 33. ITC^Deltacom, for example, offers a bundled package consisting of facilities-based long distance, local service, data and Internet access services and customer premises equipment. ITC^Deltacom Aug. 16, 2001 Petition at 1-2. NewSouth markets to small businesses, typically leasing a single DS1 as a UNE to support a mix of voice and data services. NewSouth Comments at 5. Over 90% of NewSouth customers are being served by DS1s upgraded from previous analog services. *Id.* NewSouth has deployed digital circuit and packet switches and leased intercity lit fiber from third parties to connect its switches and collocated equipment in incumbent LEC central offices. *Id.* at 9. NewSouth states that its facilities allow it to offer customers better prices and more and varied services. *Id.* at 9-10.

[161] 47 U.S.C. § 271. As an incentive to BOCs opening their local markets, Congress enacted section 271, which allows the Commission to grant BOCs entry into the interLATA market after the BOC has demonstrated that it has implemented the necessary conditions to open its market. The first section 271 authority was granted to Verizon in New York in December 1999. *Application by Bell Atlantic New York for Authorization Under Section 271 of the Communications Act To Provide In-Region, InterLATA Service in the State of New York*, CC Docket No. 99-295, Memorandum Opinion and Order, 15 FCC Rcd 3953 (1999) (*Bell Atlantic New York 271 Order*).

[162] Population numbers include Alaska, Hawaii and all of Connecticut. BOCs do not operate in Alaska and Hawaii. Some states have a low percentage of BOC access lines or, as is the case in SBC's territory in Connecticut, are not subject to section 271.

[163] *BellSouth FL/TN 271 Order*, 17 FCC Rcd 25828.

[164] The exception to this statement was the provision of commercial mobile radio service (CMRS), a service which had 44 million residential and business telephony subscribers in 1996. *Trends in Telephone Service May 2002 Report* at Table 12.2. However, the number of subscribers has risen to almost 129 million by mid-2002. *Local Telephone Competition December 2002 Report* at Table 11. Commercial mobile service is any mobile service, as defined in section 3 of the Act, as amended, provided for profit and making interconnection services available to the public. *See* 47 U.S.C. § 332(d)(1). Commercial Mobile Services became known by the Commission as the Commercial Mobile Radio Service, or CMRS. *See* 47 C.F.R. § 20.9. Mobile Telephony is a "CMRS."

93 percent of the United States population lived in a zip code served by at least one competitive LEC providing some kind of service.[165] It appears that competitive LECs are more often found in urban than rural areas.[166] Over 51 percent of competitive LEC lines serve the residential/small business market while over 78 percent of BOC lines serve this group.[167]

51. The mass market has also seen competition increase in the provision of broadband services, largely fueled by the popularity of the Internet.[168] The residential market for Internet access has supported additional line growth for dial-up service. In 1988, only 2.7 percent of households had two or more telephone lines. That percentage steadily increased to 9.1 percent in 1992, 16.8 percent in 1996, 19.7 percent in 1998, and 26.5 percent in 2000.[169] Internet access has spurred growing xDSL subscription. As of mid 2002, there were about 5.1 million xDSL lines in service. Incumbent LECs were the major providers of xDSL service with 95.6 percent of xDSL lines, while competitive LECs accounted for 4.4 percent.[170] Eighty-two percent of the incumbent LECs' xDSL lines and 39 percent of the competitive LECs' xDSL lines are residential. The BOCs served about 4.5 million xDSL customers in mid 2002. Due to technical network limitations and other reasons, less than 50 percent of BOC customers are able to subscribe to xDSL. One state commission expects this percentage to rise to about 75 percent by 2005.[171]

52. The mass market has also experienced increased narrowband and broadband competition from intermodal competitors. Cable operators have expanded into both voice telephony and cable modem service, which have, to a limited extent, competed with services of traditional wireline providers.[172] The cable companies have remained focused on mass market,

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[165] *Local Telephone Competition December 2002 Report* at Table 13. Competitive LECs' access lines total about 17 million, or 9% of total U.S. access lines. *Id.* (calculation using Table 3 and Table 4). By mid-2002, over 11 million BOC lines had been leased as UNE-L or UNE-P to competitive LECs. *Id.* at Table 4.

[166] Thirty-three percent of all zip codes, serving about 7% of the population, have no competitive LEC presence. *Id.* at Table 12; *see also* James Zolnierek, James Eisner & Ellen Burton, *An Empirical Examination of Entry Patterns in Local Telephone Markets*, 19 J. REG. ECON. 143-59 (2001) (quantifying increased competitive LEC presence in areas with a high percentage of urban households).

[167] *Local Telephone Competition December 2002 Report* at Table 2.

[168] *See* FCC Technical Advisory Council, Optical Working Group, *Broadband Access Platforms for the Mass Market – An Assessment* (Dec. 4, 2002), <http://www.fcc.gov/oet/tac/Broadband_Access_Supporting_Materials_12_4_02.ppt>.

[169] *Trends in Telephone Service May 2002 Report* at Table 8.4. It appears that the proportion of households with additional lines declined to 24.6% for 2001. Preliminary staff estimate for 2001.

[170] *High Speed Services December 2002 Report* at Table 5

[171] Letter from Lila A. Jaber, Chairman, Florida Public Service Commission, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 96-98, 98-146, 98-147, 01-337, 02-33, Attach. at 12-15 (filed Nov. 6, 2002) (Florida Commission Nov. 6, 2002 *Ex Parte* Letter).

[172] The largest such residential service cable companies are Adelphia Business Solutions/Hyperion, Cablevision Lightpath, Comcast Business Communications, Cox Fibernet/Cox Business Services and Time Warner Telecom. (continued....)

largely residential service consistent with their historic residential network footprints, and bundling telephone service with cable modem services.[173] More broadly, cable companies are offering cable modem service capability to 71 percent of United States households with a current take rate of about 11 percent.[174] In 2002, cable companies provided cable modem service to approximately 9.2 million subscribers.[175] Some cable companies have begun offering local voice service.[176] In mid-2002, cable telephony represented over 2.5 million access lines in 27 states, a 39 percent growth over the previous year.[177] Industry sources state that over 10 million households have access to cable telephony.[178] Cable companies' voice service competes with the primary landline voice service and second line while cable modem service competes with second line dial-up service and xDSL service.

53. Wireless telephone subscriber growth for the mass market has been remarkable. From fewer than 100,000 subscribers in 1984, there were over 5 million subscribers by 1990, over 44 million in 1996, and almost 129 million by mid-2002.[179] Over 90 percent of the United States population lives in counties served by three or more wireless operators; about two in five Americans now have a mobile phone.[180] Prices for wireless service have steadily declined in recent years. In 1990 average wireless bills were over $80 a month while the average monthly bill in mid-2001 was about $46.[181] Sixty-one percent of households had at least one wireless

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National Cable & Telecommunications Association, *Cable Telephony: Offering Consumers Competitive Choice*, at 8-9 (July 2001) (NCTA 2001 Report), <http://www.ncta.com/pdf_files/Telephony_ReportComplete.pdf>.

[173] However, there is some recent cable expansion into the enterprise market. Letter from Edward Shakin, Vice President and Associate General Counsel, Verizon, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-338, 96-98, 98-147, 02-33, 01-337 at 1-4 (filed Jan. 15, 2003) (Verizon Jan. 15, 2003 *Ex Parte* Letter).

[174] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable And Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-146, Third Report, 17 FCC Rcd 2844, 2871-72, paras. 65-66 (2002) (*Third Section 706 Report 2002*); *High Speed Services December 2002 Report* at Table 1. Some analysts expect cable modem subscriptions to increase to 28-30 million by 2006 with a 40% penetration rate. *Third Section 706 Report 2002*, 17 FCC Rcd at 2872, para. 66.

[175] *High Speed Services December 2002 Report* at Table 5.

[176] Cox and AT&T are the largest voice-over-cable providers. NCTA 2001 Report at 1-4.

[177] *Local Telephone Competition December 2002 Report* at Table 5 and staff calculation.

[178] BOC UNE Fact Report 2002 at II-11.

[179] *Local Telephone Competition December 2002 Report* at Table 11. The wireless survey data present total cellular, broadband personal communications service (PCS), and specialized mobile radio (SMR) subscribers and does not distinguish between mass market and enterprise customers.

[180] BOC UNE Fact Report 2002 at I-4.

[181] *Trends in Telephone Service May 2002 Report* at Table 12.3.

telephone in mid-2001.[182] Notably, 3 to 5 percent of wireless customers use their wireless phone as their only phone.[183] Some carriers attribute, at least in part, the recent drop in wireline switched access lines[184] to this replacement of wireline phones by wireless phones. This replacement may particularly affect second-line growth.[185]

54. High-speed satellite data service is also available in most areas of the United States. Satellite broadband exists and is most attractive where xDSL or cable modem service is not available.[186] But satellite services generally are not price competitive with wireline services in the mass market except in specialized situations.[187] As two-way Internet connectivity is deployed and if prices decline over time, satellite service may become a more viable alternative

[182] *Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993*, Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Seventh Report, 17 FCC Rcd 12985, 13016 (2002) (*Seventh Wireless Report 2002*).

[183] *Id.* at 13017.

[184] Since 2000, we have seen for the first time a decrease in the number of retail access lines served by the incumbent LECs: from 2000 to 2002, their share of access lines declined by about nine million, or about 4.7%. *Local Telephone Competition December 2002 Report* at Table 4. Some of the decline can be attributed to a decline in additional lines in households. Recent growth in additional residential lines in a household, from 16.8% in 1996 to 26.5% in 2000, appears to have decreased to less than 25% in 2001. *Trends in Telephone Service May 2002 Report*, Table 8.4 and preliminary staff estimate for 2001. Despite the recent drop in the number of BOC retail switched access lines, the retail and wholesale lines combined provided by BOCs have increased each year since 1996. BOC business service offerings have expanded in recent years with more special access (measured as DS0 equivalents). Considering all switched and non-switched access lines, the BOCs' total access line count has increased in recent years, at 188.3 million in 1999, 228.5 million in 2000 and 235.3 million in 2001. *See Statistics of Communications Common Carriers September 2002 Report* at Table 2.6; Industry Analysis Division, Common Carrier Bureau, *Statistics of Communications Common Carriers* (Sept. 2001) at Table 2.6 (*Statistics of Communications Common Carriers September 2001 Report*); Industry Analysis Division, Common Carrier Bureau, *Statistics of Communications Common Carriers* (Aug. 2000) at Table 2.6 (*Statistics of Communications Common Carriers August 2000 Report*).

[185] *Seventh Wireless Report* 2002, 17 FCC Rcd at 13016-17. The penetration rate is calculated by dividing total wireless subscribers by total population. Such replacement may also be occurring for long distance. *Id.* at 13018. Other forms of wireless availability have improved in recent years, becoming a possible method to access the Internet for some customers. Mobile data services had between 2 and 2.5 million subscribers in 2000 and between eight and ten million subscribers in 2001. *Id.* at 13038-39.

Local Multipoint Distribution System (LMDS) is another fixed wireless broadband transmission technology. Most effective where customers are closely grouped, this line-of-sight transmission technology has not been significantly deployed. About $220 million LMDS investment occurred in 2001, as compared to $61 million the year before. *See* TIA 2002 Market Review at 195. As the wireless technology continues to improve, wireless may become a more practical and attractive alternative to wireline for data services.

[186] *Third Section 706 Report 2002*, 17 FCC Rcd at 2877, para. 78. Until recently, only one-way Internet connectivity was available, with a dial-up upstream connection accompanied by a high-speed satellite-based downstream path. *Id.* at 2880, para. 85.

[187] Some analysts estimate that the 20-30 million United States homes where cable modem or xDSL is not available are the most likely current potential customers for satellite services. *Id.* at 2877, para. 78.

to terrestrial high-speed services like xDSL. In 2001, there were only 212,610 reported high speed service subscribers of satellite and fixed wireless combined.[188]

V. PRINCIPLES OF UNBUNDLING

55. In this Part, we set forth our new standards and guiding principles for determining when a network element should be unbundled. We adopt below an approach to unbundling that is faithful to the statute, responsive to the Supreme Court and the D.C. Circuit, economically rational, and that embraces the states' involvement in the unbundling process.

56. In subpart A, we interpret the definition of "network element" contained in section 153(29) of the Act as it relates to our unbundling inquiry. Specifically, we conclude that a "network element" refers to an element of the incumbent LEC's network that is capable of being used to provide a telecommunications service. In subpart B, we set forth our new interpretation of "impair." We analyze principles from the Supreme Court and D.C. Circuit opinions on "impair"; what guidance we derive from the language, structure, purposes, and history of the 1996 Act; and what lessons we can take from economic and legal literature on topics that bear some resemblance to the ambiguous "impair" standard in an effort to make our interpretation as economically rational as possible. From these sources, we derive an interpretation of "impair" that asks whether lack of access to an incumbent LEC network element poses a barrier or barriers to entry, including operational and economic barriers, that are likely to make entry into a market uneconomic. We will apply this interpretation of "impair" to individual elements in a more granular manner than the Commission has in the past, taking into account different customer classes, geographic considerations, and service considerations. We also explain the relationship between unbundling obligations and implicit support flows.

57. In subpart C, we reaffirm our existing interpretation of the "necessary" standard. In subpart D, we reaffirm our interpretation of the "at a minimum" language of section 251(d)(2), although we emphasize that we apply this language with restraint throughout the Order, and we find no instances on this record where unbundling is warranted in the absence of impairment. In subpart E, we explain the critical role of the states in the unbundling process; specifically, we explain how we will delegate to the states the authority to perform a more granular analysis to determine where unbundling is appropriate, and the extent to which states may establish unbundling requirements pursuant to state law that are consistent with federal requirements.

A. Definition of "Network Element"

58. We reaffirm our previous interpretation of the definition of "network element," set forth in section 153(29) of the Act, as requiring incumbent LECs to make available to requesting carriers network elements that are capable of being used in the provision of a telecommunications service.[189] Section 153(29) defines "network element" as "a facility or

[188] Industry Analysis and Technology Division, Wireline Competition Bureau, *High Speed Services for Internet Access: Status as of December 31, 2001* (July 2002) at Table 1, Table 2 (*High Speed Services July 2002 Report*).

[189] *UNE Remand Order*, 15 FCC Rcd at 3845, para. 329.

equipment used in the provision of a telecommunications service. Such term also includes features, functions and capabilities that are provided by means of such facility or equipment . . . ."[190] As an initial matter, we disagree with those commenters that continue to argue that "network elements" can only be physical facilities or pieces of equipment and therefore cannot include mere features, functions, and capabilities of a physical facility or equipment, such as a portion of the available bandwidth of a loop.[191] Several courts, including the Supreme Court, have previously considered and rejected this argument. Indeed, the Supreme Court stated that "[g]iven the breadth of [Congress's network element] definition, it is impossible to credit the incumbents' argument that a 'network element' must be part of the physical facilities and equipment used to provide local telephone service."[192]

59. In addition, the definition of a network element is ambiguous as to whether the facility or equipment (and the accompanying features, functions and capabilities) must be *actually used by the incumbent LEC* in the provision of a telecommunications service or must be *capable of being used* by a requesting carrier in the provision of a telecommunications service regardless of whether the incumbent LEC is actually using the network element to provide a telecommunications service.[193] We find that, taken together, the relevant statutory provisions and the purposes of the 1996 Act support requiring incumbent LECs to provide access to network elements to the extent that those elements are capable of being used by the requesting carrier in the provision of a telecommunications service. We note that, by using the terms "features, functions, and capabilities," the definition itself uses broad and expansive terminology in defining its scope. For example, the term "capability" is defined in Webster's New College Dictionary as "potential ability."[194] Limiting a requesting carrier's ability to obtain access only to facilities or equipment (and associated features, functions and capabilities) actually used in the provision of a telecommunications service would require a reading in tension with this definition.

60. With regard to the purposes of the Act, as mentioned above, section 251(d)(2) requires the Commission to consider whether the failure to provide access to a particular network element would impair the ability of a requesting telecommunications carrier "to provide the services that *it* seeks to offer."[195] To interpret the definition of "network element" so narrowly as to mean only facilities and equipment actually used by the incumbent LEC in the provision of a

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[190] 47 U.S.C. § 153(29).

[191] *See, e.g.*, Verizon Comments at 82-83.

[192] *Iowa Utils. Bd.*, 525 U.S. at 387; *see also USTA*, 290 F.3d at 430 (upholding the Commission's decision that the high frequency portion of the loop is a capability of the loop, and stating that "the Commission's view is convincing.").

[193] We look to the use by the requesting carrier as discussed below. *See infra* Part V.B.2.c (discussing our adopted service-specific approach).

[194] *See* WEBSTER'S II NEW RIVERSIDE UNIVERSITY DICTIONARY 226 (1994) (defining "capability" as "the quality or state of being capable; potential ability; the capacity to be used, treated, or developed for a particular purpose.").

[195] 47 U.S.C. § 251(d)(2)(B) (emphasis added).

telecommunications service also would be at odds with the statutory language in section 251(d)(2) and the pro-competitive goals of the 1996 Act.[196] Such a finding would deny competitive LECs any certainty about the availability of a network element in a given market unless and until a determination was made about whether the incumbent LEC is actually using that network element in its provision of a telecommunications service in that market. Providing requesting carriers with access only to those facilities and equipment actually used by the incumbent LEC would also lead to such unreasonable results as preventing a spare loop that is capable of providing second-line service from being considered a "network element" if the customer were not purchasing service over that line from the incumbent LEC.[197] Finally, an alternative reading of the statute would allow incumbent LECs to prevent competitors from making new and innovative uses of network elements simply because the incumbent LEC has not yet offered a given service to consumers. Such a result would stifle a competitor's ability to innovate and could hinder deployment of advanced telecommunications services.[198]

B. The Impairment Analysis

1. The "Impair" Standard

61. In this Part, we first describe the principles that the courts have instructed us to use in interpreting the "impair" standard. We explain what guidance we can derive from the language, structure, purposes, and history of the 1996 Act itself. We examine several legal doctrines and economic theories in related or analogous areas to see what guidance they may provide as we interpret the ambiguous "impair" standard. Finally, we explain our new interpretation of the "impair" standard, which draws on all these sources.

a. Court Decisions

62. Since 1996, the Commission has twice interpreted the "impair" standard, and twice the courts have remanded its interpretation as lacking the rigor intended by Congress. In its first attempt to interpret and apply the unbundling provisions of the 1996 Act, the Commission

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[196] *See, e.g.*, Letter from David Lawson, Counsel for AT&T, to Marlene H. Dortch, Secretary, FCC, CC Docket No. 01-338 at 12-13 (filed Dec. 23, 2002) (arguing that the manner in which an incumbent LEC chooses to use its facilities is irrelevant to competitive LECs' rights under section 251(c)(3)) (AT&T Dec. 23, 2002 Broadband *Ex Parte* Letter).

[197] *See* Letter from Praveen Goyal, Senior Counsel for Government & Regulatory Affairs, Covad, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-338, 02-33 at 3 (filed Jan. 10, 2003) (Covad Jan. 10, 2003 *Ex Parte* Letter).

[198] Section 706, reproduced in the notes under section 157 of the Act, directs the Commission to encourage the deployment of advanced telecommunications capability to all Americans on a reasonable and timely basis. 47 U.S.C. § 157 nt. Additionally, as noted in the Joint Managers' Statement, the goals of the 1996 Act were to provide for a pro-competitive, deregulatory national framework "designed to accelerate rapidly private sector deployment of advanced telecommunications and information technologies and services to all Americans by opening all telecommunications markets to competition . . . ." Joint Managers' Statement, S. Conf. Rep. No. 104-230, 104th Cong., 2d Sess. 113 (1996) (Joint Conference Report).

found, in section 251(c)(3), a "duty to provide all network elements for which it is technically feasible to provide access on an unbundled basis."[199] The Commission then found in section 251(d)(2) the "authority to refrain from requiring incumbent LECs to provide all network elements for which it is technically feasible to provide access on an unbundled basis."[200] In applying that "authority to refrain," the Commission interpreted "impair" to mean "'to make or cause to become worse; diminish in value,'"[201] meaning there is impairment if "the quality of service the entrant can offer, absent access to the required element, declines and/or the cost of providing the service rises."[202] In determining whether the cost would rise or the quality would decline, the Commission determined to examine whether using a different element within the incumbent LEC's network would alleviate the impairment.[203] The resulting list of UNEs was extremely broad, encompassing everything from the NID to operator services and directory assistance.

63. The Supreme Court reviewed this interpretation in *Iowa Utilities Board* and concluded that the Commission's interpretation failed to comport with the Act, which "requires the FCC to apply *some* limiting standard, rationally related to the goals of the Act."[204] In particular, the Court faulted the agency for "assum[ing] that *any* increase in cost (or decrease in quality) imposed by denial of a network element . . . causes the failure to provide that element to 'impair' the entrant's ability to furnish its desired services,"[205] and for "blind[ing] itself to the availability of elements outside the incumbent's network."[206] Specifically with regard to costs, the Court noted that if competition were perfect and all market participants were providing service at marginal cost, "the Commission's total equating of increased cost (or decreased quality) with 'necessity' and 'impairment' might be reasonable," but such had not been shown to be the case.[207] The Court also rejected the notion that section 251(c)(3) imposes a general unbundling obligation, which the Commission has the authority to temper by making individual determinations of a lack of necessity or impairment under section 251(d)(2). Rather, the Act requires the Commission to justify unbundling elements, by applying the standards of section 251(d)(2).[208]

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199 *Local Competition Order*, 11 FCC Rcd at 15640, para. 278.

200 *Id.* at 15641, para. 279.

201 *Id.* at 15643, para. 285 (quoting RANDOM HOUSE COLLEGE DICTIONARY 665 (rev. ed. 1984)).

202 *Id.*

203 *Id.*

204 *Iowa Utils. Bd.*, 525 U.S. at 388 (emphasis in original).

205 *Id.* at 389-90 (emphasis in original).

206 *Id.* at 389.

207 *Id.* at 390.

208 *See id.* at 391-92.

64. Justice Breyer concurred with the majority's handling of the "impair" standard, and added several specific concepts to elaborate on the Court's statement that the Commission must find "*some* limiting standard" in its interpretation of "impair."[209] Overall, Justice Breyer stated his belief that the Act calls for "balance" between unbundling's benefits to competition and its social and administrative costs.[210] On the one hand, Justice Breyer acknowledged that unbundling benefits competition by "seek[ing] to facilitate the introduction of competition where practical, *i.e.*, without inordinate waste."[211] On the other hand, Justice Breyer expressed his view that unbundling "can have significant administrative and social costs inconsistent with the Act's purposes."[212] Specifically, unbundling has administrative costs because two competitors are sharing the same facility. Someone must manage that sharing, and that management costs something. Also, unbundling has social costs, Justice Breyer explained, in the diminished incentives of the facility owner to "keep up or improve the property," as it must share the benefits of those investments with its competitors.[213] Justice Breyer also expressed his view that the Act imposes limits on unbundling that are related to antitrust's essential facilities doctrine.[214]

65. In response to the Supreme Court's remand, the Commission interpreted the "impair" standard anew in the *UNE Remand Order*, attempting to take the Court's criticisms into account. The Commission concluded that:

> the failure to provide access to a network element would "impair" the ability of a requesting carrier to provide the services it seeks to offer if, taking into consideration the availability of alternative elements outside the incumbent's network, including self-provisioning by a requesting carrier or acquiring an alternative from a third-party supplier, lack of access to that element materially diminishes a requesting carrier's ability to provide the services it seeks to offer.[215]

In determining whether alternatives are in fact available, the Commission stated it would consider the factors of cost, timeliness, quality, ubiquity, and impact on network operations.[216] The resulting list of UNEs was narrower than the Commission's first list to the extent the Commission excluded some circuit switches, operator services, and directory assistance. The

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209 *See id.* at 427-31 (Breyer, J., concurring with regard to unbundling rules).

210 *Id.* at 429-30 (Breyer, J., concurring).

211 *Id.* at 428.

212 *Id.*

213 *Id.* at 428-29.

214 *Id.* at 428.

215 *UNE Remand Order*, 15 FCC Rcd at 3725, para. 51.

216 *Id.* at 3731, para. 65; *see also supra* Part III.

Commission did, however, extend unbundling requirements to dark fiber, subloops, and packet switches in some circumstances.

66. As explained above, shortly before the D.C. Circuit addressed the Commission's revised unbundling standards in *USTA*,[217] the Supreme Court issued its decision in *Verizon*[218] upholding the TELRIC pricing standard and the Commission's combinations rules. The *Verizon* Court placed special emphasis on the deference owed to the Commission's interpretation of the Act, noting that section 252(d)(1), which authorized the Commission to set "just and reasonable" UNE rates "based on the cost . . . of providing the . . . network element," left the Commission "ample discretion" in establishing a rate-setting methodology.[219] The Court's task was therefore not to determine whether TELRIC was the *ideal* pricing mechanism, but rather to evaluate whether the TELRIC methodology reflected a *reasonable* interpretation of the Act, given the leeway accorded the Commission.[220]

67. While *Verizon* addressed the section 252(d)(1) pricing standard rather than the section 251(d)(2) "impair" standard, the decision touched on issues related to our analysis here. However, consistent with the deference described above, the Court refrained from issuing particular policy mandates, confining its inquiry to the reasonableness of the Commission's chosen approach. For example, while the majority accepted as "plausibl[e]"[221] the Commission's arguments that TELRIC pricing would not stifle investment in new facilities, it did not purport to resolve the parties' disagreement on this score, and did not preclude later modification of the TELRIC rules or other aspects of the unbundling regime. Instead, the Court recognized that it was "in no position to assess the precise economic significance" of the parties' opposing arguments regarding incentives,[222] and that it "ha[d] no idea whether a different forward-looking pricing scheme would have generated even greater competitive investment than the $55 billion that the entrants claim."[223] Thus, it merely acknowledged that the Commission had been forced to decide whether it was "better to risk keeping more potential entrants out, or to induce them to compete in less capital-intensive facilities with lessened incentives to build their own bottleneck

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[217] *USTA*, 290 F.3d at 415.

[218] *Verizon*, 535 U.S. at 467.

[219] *Id.* at 500; *see also id.* at 523 ("In short, the incumbents have failed to carry their burden of showing unreasonableness to defeat the deference due the Commission.").

[220] *See, e.g., id.* at 523 ("TELRIC appears to be a reasonable policy for now, and that is all that counts.")

[221] *Id.* at 504.

[222] *Id.* at 507.

[223] *Id.* at 517.

facilities,"[224] and found that in such circumstances, "[i]t was not obviously unreasonable for the FCC to prefer the latter."[225]

68. Days later in the *USTA* decision, the D.C. Circuit squarely addressed the *UNE Remand Order*'s interpretation of "impair" and found substantial faults with it.[226] First, the court echoed the call Justice Breyer made in *Iowa Utilities Board* for "balance," stating that the Act contemplates some trade-offs between the pro-competition benefits of unbundling and the detriments of unbundling such as the disincentives to investment and the costs of managing shared facilities.[227] With regard to the Commission's treatment of cost disparities, the D.C. Circuit found that the Commission erred by considering as relevant "cost disparities that are universal as between new entrants and incumbents in *any* industry."[228] The D.C. Circuit also cautioned the Commission to consider the competitive landscape when making an unbundling determination, and not to exclude the participation of relevant intermodal competitors as a relevant factor in the analysis.[229] Finally, the D.C. Circuit noted that the essential facilities doctrine might "offer useful concepts for agency guidance" in interpreting the unbundling provisions of the 1996 Act, even if the Act does not require its use.[230]

b. Guidance from the Act and Its History

69. In this Part, we explain what we derive from the language, structure, purposes, and history of the "impair" standard and the 1996 Act as we attempt to interpret it in a manner that is faithful to its language, comports with Congress's intent, responds fully to the courts, and is economically rational. The "impair" language itself is ambiguous, and as one Justice has

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[224] *Id.* at 510.

[225] *Id.* Thus, we disagree with commenters that suggest that *Verizon* mandates a particular result in this Order. While we acknowledge the Court's statement that the 1996 Act was meant "to reorganize markets by rendering regulated utilities' monopolies vulnerable to interlopers" and that its ratesetting mechanism is "designed to give aspiring competitors every possible incentive to enter local retail telephone markets," *id.* at 489, we adhere, as we must, to the Court's specific statement with regard to "necessary" and "impair" that the Commission must find "*some* limiting standard, rationally related to the goals of the Act." *Iowa Utils. Bd.* 525 U.S. at 388 (emphasis in original). *But see, e.g.*, Talk America Reply at 2-4; NuVox Reply at 3-4.

[226] *See generally USTA*, 290 F.3d at 415 (cert. denied after adoption of this Order but before release). Because the D.C. Circuit found substantial fault with the *UNE Remand Order* and because the *Triennial Review NPRM* asked sweeping questions about retooling the Commission's unbundling policies, we dismiss as moot the portion of the CompTel Nov. 26, 2001 Joint Conference Petition in which CompTel seeks a narrow review of the *UNE Remand Order* that would preclude parties from using this Triennial Review as a reconsideration proceeding. *See* Competitive Telecommunications Association Petition, CC Docket No. 96-98 (filed Nov. 26, 2001) (CompTel Nov. 26, 2001 Joint Conference Petition).

[227] *USTA*, 290 F.3d at 425, 427.

[228] *Id.* at 427 (emphasis in *USTA*).

[229] *Id.* at 429-30.

[230] *Id.* at 428 & n.4 (*cert. denied* after adoption of this Order, but before release).

explained, this ambiguity reflects "congressional uncertainty about the extent to which compelled use of an incumbent's facilities will prove necessary to avoid waste."[231] Thus, it is up to the Commission to resolve the ambiguity of the "impair" standard.

70. We note that other language in the 1996 Act provides some clues as to Congress's intent. First, we look to the Preamble of the 1996 Act, which calls it "[a]n Act [t]o promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies."[232] We believe that this language gives the best snapshot of Congress's overall intent in enacting the 1996 Act. We reaffirm the conclusion in the UNE Remand Order that facilities-based competition serves the Act's overall goals.[233]

71. Specifically as to "impair," we note an important distinction that the Act makes, which provides us guidance on how to interpret this term. Section 251(d)(2) of the Act contains two different standards, "necessary" and "impair."[234] The "necessary" standard, which applies to proprietary elements, instructs the Commission to consider whether "access to such network elements as are proprietary in nature is *necessary*."[235] By contrast, the "impair" standard, which applies to non-proprietary elements, instructs the Commission to consider whether "the failure to provide access to such network elements would *impair* the ability of the telecommunications

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[231] *Iowa Utils. Bd.*, 525 U.S. at 428 (Breyer, J., concurring). Justice Breyer asks whether wireless or cable technologies might provide the local telephone competition for which Congress was striving, without the need for extensive unbundling of incumbent LECs' facilities. *Id.*

[232] *See* Preamble to the 1996 Act.

[233] *UNE Remand Order*, 15 FCC Rcd at 3704, para. 14; *see also, e.g.*, BellSouth Comments at 7; Progress & Freedom Foundation Comments at 5, 7-8; Progress & Freedom Foundation Reply at 3-4 (recognizing that markets can support a limited number of facilities-based competitors). Facilities-based competition better serves the goal of deregulation because it permits new entrants to rely less on incumbent LECs' facilities and on regulated terms for access and price. And it serves the goal of innovation because new facilities are more likely to have additional capabilities to provide new services to consumers and competitors' deployment of new facilities is likely to encourage incumbents to invest in their own networks. *See, e.g.*, Qwest Comments at 3; SBC Comments at 25-26; BellSouth Comments, Declaration of Howard A. Shelanski at paras. 7-9, 14-16 (BOC Shelanski Decl.) (also attached to SBC Comments and Verizon Comments); Qwest Farrell Reply Decl. at paras. 5-6. *But see, e.g.*, WorldCom Reply at 51. Facilities-based competition also increases the likelihood that new entrants will find and implement more efficient technologies, thus benefiting consumers. *See* BOC Shelanski Decl. at paras. 7-9. We thus disagree that duplication of facilities is necessarily "wasteful." We expect consumer benefits to follow from new entrants' investment in facilities, and where duplication is uneconomic, those facilities often will be unbundled pursuant to our analysis. *See, e.g.*, Verizon Reply at 24-27. Finally, facilities-based competition creates network redundancy, which increases reliability and enhances national security. *See* CompTel Comments at 78-79; SBC Comments at 26; USTA Comments at 5. Thus, we disagree with commenters that argue that the Act contains a "statutory mandate of equal treatment for all three options," although we are aware that Congress created an unbundling vehicle because complete duplication of the incumbent LECs' networks is not feasible. CompTel Comments at 9-12. *See generally, e.g.*, ASCENT Comments at 20-22; Utah Commission Reply at 2.

[234] 47 U.S.C. § 251(d)(2)(A), (B).

[235] *Id.* § 251(d)(2)(A) (emphasis added).

carrier seeking access to provide the services that it seeks to offer."[236] In past orders, the Commission has interpreted the "necessary" standard as a more rigorous standard than the "impair" standard, and this construct has not been disturbed by the courts. We believe it is reasonable to continue to interpret the "impair" standard as less demanding than the "necessary" standard.[237] We believe this approach reflects Congress's intentions in creating two distinct standards for two classes of elements.

72. As we formulate our interpretation of "impair" that is less demanding than "necessary," however, we remain cognizant that Congress did not create a general duty to unbundle, tempered by the "impair" standard of section 251(d)(2). As the courts have explained, if Congress had wanted to create a general unbundling duty, it would not have included the "impair" standard in the Act at all.[238] Thus, we must interpret the "impair" standard as Congress's direction for us to make specific, affirmative findings that elements should or should not be unbundled.

c. Guidance from Analogous Legal Doctrines and Economic Literature

73. In this Part, we cull concepts from many years of scholarly work and debate in legal and economic fields that resemble our "impair" standard in some way. Some of these legal doctrines and economic theories, such as essential facilities and natural monopoly, were described in the *USTA* decision and Justice Breyer's concurring opinion in *Iowa Utilities Board* as providing guidance on the appropriate standard to adopt. Other doctrines and theories, such as the Horizontal Merger Guidelines (HMG) used in antitrust and the economic theories developed in the barriers to entry literature, were proffered by commenters as providing models for such a standard. While we discuss later why we do not adopt any single one of these doctrines or theories in toto as our standard, we find that the lessons learned from these legal doctrines and economic theories help us develop an impairment standard, and will also help us in our attempt to apply this standard in our analysis of specific network elements.

74. *Several Standards Are Possible For Defining Impairment.* While the Act provides no definition of "impair," there are a number of possible definitions available from the legal and economic literatures for determining when impairment exists. One approach is to use the economic concept of barriers to entry to examine whether competitors are prevented from entering a particular market.[239] They include definitions by Joe Bain (any factor preventing entry

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[236] *Id.* § 251(d)(2)(B) (emphasis added).

[237] *See, e.g.*, AT&T Reply at 35.

[238] *See Iowa Utils. Bd.*, 525 U.S. at 390 ("[I]f Congress had wanted to give blanket access to incumbents' networks on a basis as unrestricted as the scheme the Commission has come up with, it would not have included § 251(d)(2) in the statute at all.").

[239] The Commission previously discussed barriers to entry in its section 257 report. *See generally Section 257 Proceeding To Identify and Eliminate Market Entry Barriers for Small Businesses*, GN Docket No. 96-113, Report, 12 FCC Rcd 16802 (1997) (*Section 257 Report*).

when incumbents are earning above average profits)[240] and George Stigler (any factor that creates a cost faced by new entrants but not by the incumbent).[241] The essential facilities doctrine provides another construct for identifying when entry is hindered, focusing on whether a particular facility is needed for an entrant to serve the market.[242] In addition, the HMG attempt to determine whether entry will be "timely, likely, and sufficient" to deter incumbents from exercising market power.[243] As explained below, no one of these standards comports with the

[240] Bain defined a barrier to entry as "the extent to which, in the long run, established firms can elevate their selling prices above minimal average costs of production and distribution . . . without inducing potential entrants to enter the industry." JOE S. BAIN, INDUSTRIAL ORGANIZATION 252 (2d ed. 1968); *see also* W. KIP VISCUSI, JOHN M. VERNON, & JOSEPH E. HARRINGTON, JR., ECONOMICS OF REGULATION AND ANTITRUST 156 (3d ed. 2000). Bain argued that barriers to entry typically fall into the categories of absolute cost advantages, scale economies, and product differentiation. *See* JOE BAIN, BARRIERS TO NEW COMPETITION 12-16 (reprint 1993).

[241] George Stigler defined a barrier to entry as "a cost of producing . . . which must be borne by a firm which seeks to enter an industry but is not borne by firms already in the industry." GEORGE STIGLER, THE ORGANIZATION OF INDUSTRY 67 (1968). His definition of barriers to entry is narrower than Bain's definition, excluding any factor that had to be met by incumbent and entrant alike. One interpretation is that the advantages gained by an incumbent due to entering the market first could be viewed as an appropriate reward to those who took the risk of making the first investment. *See* Jonathan B. Baker, *Responding to Developments in Economics and the Courts: Entry in the Merger Guidelines* at 4-5 (2002), <http://www.usdoj.gov/atr/hmerger/11252.pdf>. For example, the presence of scale economies alone would not be a barrier to entry under his definition, even if they were large enough to permit only one firm to occupy the market, because entrants would face the same cost structure as the incumbents, and could achieve the same average costs as the incumbents if they were able to attract the same number of customers. Likewise, he argued that capital requirements and advertising costs are not barriers to entry, if both incumbents and entrants have the same obligation. *See* STIGLER, *supra*, at 67-70. More recently, Christian von Weizsacker proposed to restrict Stigler's definition to limitations to entry that create economic inefficiency. Thus, he would define a barrier to entry that may warrant regulatory intervention as costs borne by entrants and not by incumbents that distort the operation of the market in a socially undesirable way. *See* C.C. von Weizsacker, *A Welfare Analysis of Barriers to Entry*, 11 BELL J. ECON. 400 (1980). Stigler's more limited definition of barriers to entry, and his use of price theory to analyze whether various factors are likely to impede entry, fit in with the "Chicago School's" emphasis on the use of economic theory to determine whether firm behavior causes harm to consumers, its belief that there should be a more permissive merger policy, and its skepticism of the need for vigorous antitrust action to prohibit many commonplace practices such as tie-ins and resale price maintenance. *See* Baker, *supra*, at 5-6; Richard A. Posner, *The Chicago School of Antitrust Analysis*, 127 U. PA. L. REV. 925-34 (1979).

[242] Under the essential facilities doctrine, a firm controlling a facility deemed essential is required to share that facility with competitors at a reasonable price. *See* 3A PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION, para. 771 (2001); Mats A. Bergman, *The Role of the Essential Facilities Doctrine*, 46 ANTITRUST BULL., Summer 2001, at 403. Although the Supreme Court has never explicitly adopted the essential facilities doctrine, it has determined that refusal to provide access to an essential facility to competitors can be an antitrust violation. *See* AREEDA & HOVENKAMP, *supra*, paras. 772-73; Phillip Areeda, *Essential Facilities: An Epithet in Need of Limiting Principles*, 58 ANTITRUST L.J. 841 (1989). To prove antitrust liability under the essential facilities doctrine, four conditions have been identified by circuit courts: (1) The facility is controlled by a monopolist; (2) Competing firms lack a reasonable ability to reproduce the facility; (3) Competing firms have been denied access to the facility; and (4) It is feasible to provide access to the facility. *See MCI Communications Co. v. American Tel. & Tel. Co.*, 708 F.2d 1081, 1132-33 (7th Cir. 1983); *see also* Bergman, *supra*, at 407-08; Robert Pitofsky, *The Essential Facilities Doctrine Under United States Antitrust Law*, 708 PLI/PAT 775, 781-82 (2002).

[243] The HMG were developed to embody economic theory in a set of guidelines for determining whether mergers would cause harm. As one of the steps of analysis, "the Agency assesses whether entry would be timely, likely, and (continued....)

"impair" concept entirely. Indeed, these standards were developed for other purposes, and have been written about and discussed since long before the 1996 Act.

75. *Many Factors Can Act as Barriers to Entry.* Depending on the circumstances, barriers to entry can come from a variety of factors such as sunk costs,[244] scale economies,[245] scope economies,[246] absolute cost advantages,[247] capital requirements,[248] first-mover advantages,[249]

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sufficient either to deter or to counteract the competitive effects of concern." Horizontal Merger Guidelines, issued by U.S. Department of Justice and Federal Trade Commission, Apr. 2, 1992, revised Apr. 8, 1997 (HMG) § 0.2. Section 3 of the HMG, which examines the conditions under which committed entry (entry requiring significant sunk costs) will occur, is the most relevant to our analysis. HMG § 3.

Whether the Bainian or Stiglerian definition of barriers to entry should be used in the antitrust context has not been decided. Some authorities have adopted Bain's definition. *See* Baker, *supra* note 241, at 6 n.25. The Federal Trade Commission had decided that only Stiglerian barriers prevented entry that would eventually drive prices down to competitive levels. However, it also decided that a second type of barrier, an "impediment to entry," existed, which could delay entry into the market for a significant period of time. It thus effectively adopted a Bainian definition. *See* Baker, *supra* note 241, at 6-7.

[244] Sunk costs are those costs that are unrecoverable upon exit from the market. *See* DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 28 (3d ed. 2000). Scholars point out that when there are large fixed and sunk costs, fewer firms are able to profitably coexist in the industry. *See* Babu Nahata & Dennis Olson, *On the Definition of Barriers to Entry*, S. ECON. J. 236-39 (July 1989); JOHN SUTTON, SUNK COSTS AND MARKET STRUCTURE: PRICE COMPETITION, ADVERTISING, AND THE EVOLUTION OF CONCENTRATION (1991). Significant sunk costs by the incumbent can increase an entrant's concern that an incumbent will lower prices in the face of vigorous competition. In addition, large sunk costs can give a significant first-mover advantage to the incumbent. Other firms that are contemplating entry will realize that large-scale facilities-based entry on their part will create excess capacity and force prices down to marginal cost, leading to large losses. These firms are therefore unlikely to enter. *See Section 257 Report*, 12 FCC Rcd at 18614 n.48; *Merger of MCI Communications Corp. and British Telecommunications PLC*, GN Docket No. 96-245, Memorandum Opinion and Order, 12 FCC Rcd 15351, 15413, para. 162 (1997); *see also* JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 314-21 (1988); CARLTON & PERLOFF, *supra*, at 79-80. High sunk costs also increase the cost of failure to an entrant. Thus, if there is a substantial risk that entry will not be successful for various reasons, including uncertainty concerning demand for the firm's product and the firm's operational ability to enter the market and achieve profitability, then the presence of large sunk costs could raise the cost of failure and exit sufficiently to deter entry. DOUGLAS F. GREER, INDUSTRIAL ORGANIZATION AND PUBLIC POLICY 240 (3d ed. 1992). This risk could also be reflected in a higher cost of capital to entrants, thus discouraging entry into industries which are inherently risky. *See* VISCUSI, VERNON, & HARRINGTON, *supra* note 240, at 161; HMG § 3.3.

[245] Scale economies refer to lower average costs from producing a larger quantity of output. A more technical definition is that economies of scale exist at a particular range of output when the long run average total cost decreases as output expands. *See* KENNETH TRAIN, OPTIMAL REGULATION 5 (1991). Scale economies can be a barrier to entry if entrants are likely to acquire fewer customers and sell less output than the incumbent, and the resulting higher average cost for the entrants makes it difficult for them to compete with the incumbent, particularly if retail prices are close to the incumbent's average cost.

[246] Economies of scope exist when one firm can produce two or more products at a lower total cost than if each product were produced separately by different firms. *See* TRAIN, *supra* note 245, at 8. Scope economies can be a barrier to entry if entrants are unable to produce and sell all of the products the incumbent produces, and the resulting higher cost makes it unprofitable to enter the market. *See* SCHERER & ROSS, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 361 (3d ed. 1990).

strategic behavior by the incumbent,[250] product differentiation,[251] long-term contracts,[252] and network externalities.[253] Despite the different definitions that have been proposed, economists, since the advent of economic game theory, have developed a better understanding of the factors

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[247] An incumbent has an absolute cost advantage if, for any given level of output, its per unit costs are lower than for an entrant. Possible sources of absolute cost advantages include privileged access to resources, control of a better technology or more efficient means of production which cannot be duplicated by the entrant, limitations in the availability of productive factors, the learning curve, and a lower cost of capital. *See* BAIN, BARRIERS TO NEW COMPETITION, *supra* note 240, at 144-45; GREER, *supra* note 244, at 241-42; VISCUSI, VERNON, & HARRINGTON, *supra* note 240, at 156; DON E. WALDMAN & ELIZABETH J. JENSEN, INDUSTRIAL ORGANIZATION: THEORY AND PRACTICE 139-41 (2d ed. 2001).

[248] Some argue that entrants, especially small entrants, are at a disadvantage to incumbents in raising large amounts of capital. Three possible reasons given are that entrants are a riskier investment, small entrants face higher transaction costs to raise funds, and the capital market is imperfect such that large firms have more market power to obtain loans at favorable rates. *See* GREER, *supra* note 244, at 256-57; WALDMAN & JENSEN, *supra* note 247, at 141-43.

[249] When a firm is able to gain an advantage in the marketplace as a result of entering the market first, it is said to have a first-mover advantage. There are a number of sources of first-mover advantages, such as advertising and gaining brand name preference, patents, sunk costs, and rights-of-way. *See* GREER, *supra* note 244, at 264-65; CARLTON & PERLOFF, *supra* note 244, at 80.

[250] Strategic behavior refers to actions by an incumbent that prevent entry from occurring. Game theory is now often used to model the behavior of incumbents and entrants, and determine the equilibrium set of strategies. Under certain circumstances, an incumbent could deter entry if it invested in additional capacity today, such that it would be likely to lower prices when entry occurs, creating losses for everyone. Such behavior is rational only if the incumbent expects that an entrant is likely to be deterred from entry as a result. *See* OZ SHY, INDUSTRIAL ORGANIZATION 186-206 (1995); TIROLE, *supra* note 244, at 314-21; Baker, *supra* note 241, at 7-9.

[251] Product differentiation refers to firms' attempts to distinguish their products from other firms' products and gain the ability to raise the price through advertising, the development of a brand name and product image, varying the product characteristics and quality, and selling in different locations. *See* WALDMAN & JENSEN, *supra* note 247, at 357 ("The objective of product differentiation is to increase profits by increasing demand and decreasing the price elasticity of demand. Sellers attempt to differentiate their products in many ways. Common forms of differentiation include location, service, physical characteristics, and subjective image differences."); *see also* BAIN, INDUSTRIAL ORGANIZATION, *supra* note 240, at 29-30.

[252] An incumbent monopolist can induce customers to sign long-term contracts, with substantial penalties for breaching the contract. These contracts can act as a barrier to entry, if they prevent customers from switching to an entrant. *See* Philippe Aghion & Patrick Bolton, *Contracts As a Barrier to Entry*, 77 AM. ECON. REV. 388-401 (1987); TIROLE, *supra* note 244, at 196-98; HMG § 3.3.

[253] Network externalities (or network effects) exist if the benefit that a consumer derives from purchasing a good is affected by whether others take the same service. Consumers then derive greater benefit from purchasing services from larger networks. Thus, larger networks gain a competitive advantage over small networks, which allows them to charge higher prices. *See* J. Farrell & G. Saloner, *Standardization, Compatibility, and Innovation*, 16 RAND. J. ECON. 70-83 (1985); M. Katz & C. Shapiro, *Network Externalities, Competition and Compatibility*, 75 AM. ECON. REV. 424-40 (1985); OZ SHY, THE ECONOMICS OF NETWORK INDUSTRIES 17 (2001). In telecommunications networks, network externalities refer to the greater value of a network in which all users can communicate with all other users.

that impede entry.[254] There is general agreement in the economics literature on the critical importance of sunk costs, absolute cost advantages, first-mover advantages, and, in the right circumstances, scale economies, in determining the likelihood of entry.[255] In their analysis of entry, the HMG consider economic barriers to entry, focusing in particular on sunk costs and minimum viable scale (in addition to other factors).[256]

76. *Some Factors Only Cause Barriers to Entry in Particular Circumstances.* While many factors can cause barriers to entry, the economics literature points out that some are only barriers in particular circumstances, or in combination with other factors. For example, some scholars only consider capital requirements a barrier in the presence of substantial sunk costs, first-mover advantages, or risky entry.[257] Likewise, some consider scale economies a barrier only if they are large enough to prevent additional firms from profitably entering the industry, and they are combined with other factors such as significant sunk costs, long-term contracts or brand preference by consumers.[258] The HMG consider scale economies to be a barrier to entry only if

[254] *See, e.g.*, Richard J. Gilbert, *Mobility Barriers and the Value of Incumbency*, in 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 475 (Richard Schmalensee & Robert Willig, eds. 1989).

[255] *See* SHY, INDUSTRIAL ORGANIZATION, *supra* note 250, at 182-206; Gilbert, *supra* note 254, at 531; Baker, *supra* note 241, at 7-16; *see also* AT&T Reply, Declaration of Robert D. Willig (AT&T Willig Reply Decl.) at paras. 18-36.

[256] *See* HMG §§ 1.32, 3.3. Minimum viable scale is defined in the HMG as "the smallest average annual level of sales that the committed entrant must persistently achieve for profitability at premerger prices. Minimum viable scale is a function of expected revenues, based upon premerger prices, and all categories of costs associated with the entry alternative, including an appropriate rate of return on invested capital given that entry could fail and sunk costs, if any, will be lost." HMG § 3.3 (footnotes omitted). Scale economies are factored into the HMG's analysis through their impact on the minimum viable scale necessary for entry. Large scale economies are likely to create a large minimum viable scale, because it will likely require a large volume of output and sales to achieve an average cost lower than the expected price. *See* HMG § 3.3, n.31 ("The minimum viable scale of an entry alternative will be relatively large when the fixed costs of entry are large, when the fixed costs of entry are largely sunk, when the marginal costs of production are high at low levels of output, and when a plant is underutilized for a long time because of delays in achieving market acceptance."); *see also* Letter from C. Frederick Beckner, III, Counsel for AT&T, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-338, 96-98, 98-147, Attach. at 1-8 (filed Nov. 14, 2002) (AT&T Nov. 14, 2002 *Ex Parte* Letter).

[257] Whether the cost of capital to entrants, particularly when large amounts of capital are needed, can be a barrier to entry has been controversial. Some argue that capital markets are imperfect, such that entrants – *e.g.*, small competitive LECs – would have poorer access to financial resources than incumbents. *See* BAIN, BARRIERS TO NEW COMPETITION, *supra* note 240, at 55; GREER, *supra* note 244, at 256-57; WALDMAN & JENSEN, *supra* note 247, at 141-43. Others argue that both incumbent and entrant have an equal need to spend money to build plant, or to create a brand name. Only in the presence of a significant risk of failure by the entrant, not shared by the incumbent, will the entrant's higher cost of capital, due to the need for a risk premium, create a cost disadvantage for the entrant. *See* Richard A. Posner, *supra* note 241, at 945-46; VISCUSI, VERNON, & HARRINGTON, *supra* note 240, at 161.

[258] The importance of scale economies has been controversial. While Bain considered them a barrier to entry, Stigler argued that the existence of scale economies alone could not be a barrier to entry, since incumbents and entrants would face the same costs. *See* STIGLER, *supra* note 241, at 67-69. Subsequent writers have suggested that entry is still possible in the face of scale economies when an entrant could, through contracts with the majority of the customers, gain the advantage from scale economies. For example, studies have shown that there are scale economies for garbage collection in smaller municipalities. Many municipalities put up the contract for bid, thus (continued....)

the minimum viable scale is larger than the sales an entrant is likely to achieve. Many scholars consider scale economies that are so pervasive as to make it less expensive for one firm to satisfy all demand within a market to be a formidable barrier to entry – a natural monopoly.[259]

77. *A Firm's Ability To Enter Is Affected by the Costs Incurred, Revenues Obtained, and Risk Involved in Entering a Market.* The economics literature generally states that a firm's decision to enter a market depends on whether the revenues it expects to obtain exceed the costs of entering and serving the market, factoring in the cost and risk of failure.[260] Thus, factors that raise an entrant's cost of service, limit its potential revenues,[261] or increase the risk or cost of failure reduce the likelihood of entry. Conversely, entry is made easier if an entrant has late-mover advantages, such as from using newer technologies or a better network architecture, or has additional revenue opportunities stemming from economies of scope. Operational barriers, which may not directly affect the long-term potential costs and revenues of the firm but could significantly delay or reduce the quality of the services an entrant is attempting to offer, must also be taken into consideration in determining the likelihood and extent of entry. In general, it is important to consider all of the relevant cost and demand characteristics of a market, including the presence and size of sunk costs, scale and scope economies, and absolute cost and first-mover advantages, as well as the full range of revenues available and countervailing late-mover advantages an entrant might possess, in determining whether entry is possible.[262]

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allowing entry, because whoever gains the contracts wins the whole market. *See* CARLTON & PERLOFF, *supra* note 244, at 76, 658.

[259] A natural monopoly exists "when the costs of production are such that it is less expensive for market demand to be met with one firm than with more than one." TRAIN, *supra* note 245, at 1. For the single product firm, this situation occurs in the presence of economies of scale over the entire range of output demanded. TRAIN, *supra* note 245, at 5; 2 ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS 119 (1989). For the multiproduct firm, a natural monopoly occurs when the cost of production for the entire set of products would be minimized if produced by one firm, *i.e.*, costs are subadditive for all relevant ranges of output for all products. Cost subadditivity is said to exist at a particular level of output for a particular set of products when one firm can produce all of those products at that level of output at a lower cost than two or more firms. WILLIAM SHARKEY, THE THEORY OF NATURAL MONOPOLY 2 (1982). This occurs if there are both economies of scale and economies of scope for all products. When a natural monopoly exists, economic theory has traditionally held that it would be inefficient to have more than one firm in the market. SHARKEY, *supra*, at 54; 2 KAHN, *supra*, at ch. 4.

[260] Stated in more technical terms, the condition is whether the net present value of the expected economic profit is positive. *See* WALDMAN & JENSEN, *supra* note 247, at 146 ("Microeconomic theory predicts that profit-maximizing firms will enter an industry if the net present value of expected profits, appropriately adjusted for risk, is positive."). Economists define "economic profit" to be the firm's revenues minus the full cost (including opportunity costs of the assets employed) of the firm. The opportunity cost of an asset is the value of its best alternative use. *See* CARLTON & PERLOFF, *supra* note 244, at 239; *see also* STEPHEN MARTIN, INDUSTRIAL ECONOMICS: ECONOMIC ANALYSIS AND PUBLIC POLICY 17 (2d ed. 1994) ("Economic profit is any accounting profit over and above the normal rate of return on an investment.").

[261] HMG § 3.3.

[262] *See* STIGLER, *supra* note 241, at 67-70; BAIN, INDUSTRIAL ORGANIZATION, *supra* note 240, at 268-69; *see also* HMG § 3.1.

78. *Need for Requirements To Be Economically Rational.* Many scholars and the federal courts have taken the view that the application of antitrust enforcement (including merger review and the essential facilities doctrine) is only necessary when the merger or behavior causes economic harm to consumers and society. That is, the antitrust law has been interpreted to include an element of economic rationality despite a lack of explicit language requiring such analysis in the statute.[263] Especially in light of guidance from courts that have already considered the Act's unbundling regime, we believe that any reasonable application of the impairment standard and unbundling requirements should be economically rational.[264]

79. *Unbundling of Bottleneck Facilities Can Cause Harms.* Scholars have pointed out that there may be countervailing reasons why the owner of a bottleneck facility should not be required to make the facility available to its potential competitors. For example, some scholars argue that if providing access to the facility would not enhance competition or provide economic benefits, courts should consider not making the facility available. Similarly, if making the facility available would deter desirable activity on the part of the owner (such as investment in upgrades or new facilities) or the entrant (such as investment in alternatives), courts should consider not making the facility available.[265]

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[263] *See* CARLTON & PERLOFF, *supra* note 244, at 604; VISCUSI, VERNON & HARRINGTON, *supra* note 240, at 66-67; ROBERT H. BORK, THE ANTITRUST PARADOX 89 (1978).

[264] *See Iowa Utils. Bd.*, 525 U.S. at 427-31 (Breyer, J., concurring); *USTA*, 290 F.3d at 425-30.

[265] *See, e.g.*, Areeda, *supra* note 242, at 841; David J. Gerber, *Rethinking the Monopolist's Duty To Deal: A Legal and Economic Critique of the Doctrine of "Essential Facilities,"* 74 VA. L REV. 1069 (1988); *see also* Qwest Comments, Attach., John Haring & Harry M. Shooshan, *Reorienting Regulation: Toward a More Facilities-Friendly Local Competition Policy* at 10-11 (Apr. 3, 2002) (Qwest Haring & Shooshan Paper); SBC Comments at 26 (*citing* PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW para. 787c (Supp. 2001)); Verizon Comments at 27-32, 34-36. In his *Epithet* article, Areeda argued that a requirement to provide access should not be imposed if: the denial of access was for a legitimate business purpose or for legitimate business reasons; it is administratively impractical for the court to supervise; it does not enhance competition in the marketplace and provide economic benefits; or if it would deter desirable activity on the part of the owner. *See* Areeda, *supra* note 242, at 852-53. Areeda provided six principles for limiting application of the essential facilities doctrine: (1) There is no general duty to share – compulsory access should be exceptional; (2) The facility should be considered essential only if it is critical for the plaintiff's ability to compete and for the development of competition in the market; (3) Providing access must be likely to improve competition substantially in the marketplace, provide economic benefits, and not chill desirable activity; (4) Denial of access must not have occurred for a legitimate business purpose; (5) The monopolist intended to exclude others by improper means; and (6) The court must be able to adequately explain and supervise the access requirement. Areeda, *supra* note 242, at 852-53; Bergman, *supra* note 242, at 409-10; *see also* BOC Shelanski Decl. at para. 38.

Gerber argued that the essential facilities doctrine should be applied only when it improves consumer welfare, and that the focus should be on the vertical relationship between the monopolist and the downstream market. He believes that the test used by most courts, that a facility is essential when its owner's refusal to provide access harms the ability of its competitors to compete, is inappropriate and fails to maximize consumer welfare. *See* Gerber, *supra*, at 1069-72. Areeda and Hovenkamp note that once a court determines to mandate access, a price that is set at the competitive level will reduce competitors' incentives to build alternative facilities, if and when this becomes feasible. *See* AREEDA & HOVENKAMP, *supra* note 242, para. 771b.

80. *The Size of Sunk Costs Is a Significant Factor in Determining the Likelihood That Competitors Will Enter.* Sunk costs are important for several reasons. Larger fixed[266] and sunk costs imply that fewer firms are able to survive profitably in the industry.[267] When combined with scale economies, high sunk costs increase the entrants' concern that the incumbent will lower its prices in response to entry, possibly to unprofitable levels for both incumbents and entrants. Large sunk costs also increase the cost of failure, so if there is a substantial risk of failure, entrants may be reluctant to take the risk, and investors may be reluctant to finance entry.[268] The size of the sunk costs figures prominently in the HMG, with special analysis reserved for "committed entry," which is entry requiring significant sunk costs.[269]

81. *Costs Incurred To Enter a Market May Not Be a Barrier to Entry.* A cost incurred by an entrant upon entry, even if fairly significant, may not be a barrier to entry if it creates no cost disadvantage relative to the incumbent, does not generate a minimum viable scale that is too large for the entrant to achieve, and does not significantly raise the cost of failure and exit. Thus, to determine whether initial entry costs are a likely deterrent to entry, the economics literature considers, among other things: whether the incumbent had to incur the same costs; how large the costs are; whether the costs are sunk; the likelihood of success in entry; and the size of the scale economies and the likely share of the markets entrants can expect to take. Entrants are unlikely to be deterred by smaller, transient entry costs that are recoverable and that do not raise the minimum viable scale above the typical market share they can expect.[270]

82. *Some Barriers to Entry Are Not Harmful.* Not all barriers to entry are harmful to competition or consumers. Some barriers are the result of firms' attempts to develop new technologies and improve their efficiencies, and the barriers provide the appropriate reward for their innovative activity.[271] For example, patent protection is a powerful barrier to entry that denies new entrants the legal right to take advantage of the patent holder's research. But patent protection provides an incentive to invest in research that would otherwise be diminished if the

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[266] Fixed costs are costs that do not vary with the level of output. *See* CARLTON & PERLOFF, *supra* note 244, at 28.

[267] *See* Nahata & Olson, *supra* note 244, at 236-23; SUTTON, *supra* note 244, at 8-11 and ch. 2.

[268] *See* HMG § 3.3.

[269] The HMG distinguish between uncommitted and committed entrants. Firms that are able to respond to a "small but significant and nontransitory" price increase within one year and with no significant sunk costs of entry and exit are considered uncommitted entrants, and treated as participants in the relevant market. HMG § 1.32. Committed entry requires significant sunk costs of entry and exit. A significant sunk cost is one that would not be recouped within one year of the commencement of the supply response, assuming a "small but significant and nontransitory" price increase in the relevant market. *Id.*

[270] GREER, *supra* note 244, at 241-46; STIGLER, *supra* note 241, at 67-70.

[271] The idea that barriers to entry and high market concentration are not always a concern to be combated with antitrust enforcement is an important point stressed by Stigler, Posner, and others in the "Chicago School." *See* VISCUSI, VERNON, & HARRINGTON, *supra* note 240, at 156; Weizsacker, *supra* note 241, at 399-400; Baker, *supra* note 241, at 5-6. *See generally* Posner, *supra* note 241.

innovator did not expect to reap monopoly profits from the innovation, at least for a period of time.[272]

83. *Incumbents' Behavior Can Influence Whether Entrants Will Want To Enter.* The extensive literature on strategic behavior and deterrence examines how incumbents, through present and future actions, could prevent entry.[273] For example, in assessing whether incumbents can profit from a price rise, the HMG do not assume that retail prices will remain elevated after entry occurs, but rather take into account the possibility that incumbents will lower prices in response to entry, thus making the entry less rewarding for new competitors.[274]

d. Interpretation of the "Impair" Standard

84. We find a requesting carrier to be impaired when lack of access to an incumbent LEC network element poses a barrier or barriers to entry, including operational and economic barriers, that are likely to make entry into a market uneconomic. That is, we ask whether all potential revenues from entering a market exceed the costs of entry, taking into consideration any countervailing advantages that a new entrant may have. As explained in detail below, this granular analysis is informed by consideration of the relevant barriers to entry, as well as a careful examination of the evidence, especially marketplace evidence showing whether entry has already occurred in particular geographic and customer markets without reliance on the incumbent LECs' networks but instead through self-provisioning or reliance on third-party sources.[275]

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[272] *See* CARLTON & PERLOFF, *supra* note 244, at 505-13; Qwest Haring & Shooshan Paper at 8-9.

[273] *See* SHY, INDUSTRIAL ORGANIZATION, *supra* note 250, at 186-206; TIROLE, *supra* note 244, at 314-21; GREER, *supra* note 244, at 305.

[274] *See* HMG § 3.3.

[275] *See* Qwest Comments at 11 ("But, of course, there is no universal, magic formula by which the Commission or anyone else can assign weights to various factors and arrive at the answer as to whether a particular element meets the 'impair' standard and should be unbundled. The basic question is whether CLECs can feasibly provide service and meaningfully compete without access to a particular type of facility."); BellSouth Reply at 12-13 ("Once the UNE market is properly defined, impairment should be tested by asking whether a reasonably efficient CLEC retains the ability to compete even without access to the UNE."); BellSouth Reply, Attach. 2, Declaration of Howard A. Shelanski, at para. 2 (BOC Shelanski Reply Decl.) (also attached to SBC Reply and Verizon Reply) ("As an economic matter, impairment must at the very least mean that CLECs suffer some disadvantages relative to the ILEC that are sufficiently great that they could tip to the negative a rational CLEC's decision about whether or not to enter a local exchange market."); Letter from William P. Barr, Executive Vice President and General Counsel, Verizon, to Michael K. Powell, Chairman, FCC, CC Docket No. 01-338 at 3 (filed Oct. 16, 2002) (Verizon Oct. 16, 2002 *Ex Parte* Letter) ("The key to the impairment analysis therefore is whether an entrant can, over time using its own facilities, profitably serve less than the entire market."); Letter from James C. Smith, Senior Vice President, SBC, to Michael K. Powell, Chairman, FCC, CC Docket Nos. 01-338, 96-98, 98-147, Attach. 1 at 5 (SBC Jan. 14, 2003 *Ex Parte* Letter).

(i) Types of Barriers to Entry

85. As suggested by the summary of economic and legal literature above,[276] there are different kinds of barriers to entry. We describe in this subpart which barriers we consider relevant to the impairment analysis. We also examine whether unbundling can address the impairment caused by these barriers. We focus on the barriers described below because we find that they are the most likely to create "impairment," that there is general recognition of the importance of these barriers in the economics literature described above and the HMG, and that they comport with our understanding of the characteristics of the telecommunications industry. We recognize, as did the *USTA* court, that at bottom all these barriers can be expressed in terms of costs, and thus to the extent described throughout this section, cost differences remain relevant to the impairment analysis.[277] Throughout our application of the impairment standard to individual elements, we ask whether the sum of these barriers is likely to make entry uneconomic, taking into account available revenues and any countervailing advantages that a requesting carrier may have.[278] Our analysis does not rest solely on the existence of cost disparities, but instead is based on determining whether entry would be profitable without the UNE in question. Therefore, the existence of cost disparities does not necessarily require a finding of impairment, but it can significantly affect our analysis through its impact on an entrant's ability to enter.[279]

86. Before discussing relevant barriers to entry, however, we note that the telecommunications industry is replete with the kinds of barriers described in the economics discussion above. For example, facilities-based entry into the telecommunications market requires a great deal of capital for equipment, network construction, and operating costs while customers are gradually added to an entrant's network.[280] The capital requirements are

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[276] *See supra* Part V.B.1.c.

[277] *See USTA*, 290 F.3d at 426 ("Of course any cognizable competitive 'impairment' would necessarily be traceable to some kind of disparity in cost."); *see also, e.g.*, WorldCom Reply at 13; Letter from Ruth Milkman, Counsel for WorldCom, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-338, 96-98, 98-147, Attach. at 2 (filed Oct. 23, 2002) (WorldCom Oct. 23, 2002 *Ex Parte* Letter).

[278] *See, e.g.*, Verizon Oct. 16, 2002 *Ex Parte* Letter at 5 (urging the Commission to take into account any countervailing advantages, such as being able to sell other services, avoid costs, achieve qualitative advantages unavailable to the incumbent LEC, cherry-pick profitable customers or markets, and use more efficient equipment and network architectures); *see also* BellSouth Comments at 25; Verizon Comments at 58; BellSouth Reply at 10; Verizon Reply at 42-43; WorldCom Reply at 18-19 (noting that any competitive LEC advantages are outweighed by disadvantages); BellSouth Reply, Reply Declaration of National Economic Research Associates, Inc. (NERA Reply Decl.) at paras. 70-74; BOC Shelanski Reply Decl. at para. 3 (noting that new entrants may have advantages of more advanced equipment, lower labor costs, and the ability to serve larger areas or to market selectively to more attractive markets). We recognize that a precise calculation of a competitive LEC's advantage is difficult or impossible, but we attempt to make reasonable deductions through our examination of marketplace and other evidence. *See* AT&T Willig Reply Decl. at para. 57.

[279] *See also infra* para. 112.

[280] While we acknowledge that the telecommunications industry is capital-intensive, we will not base our impairment analysis on competitors' current ability to access capital markets, as suggested by some commenters. (continued....)